EOS Mission Support Network Performance Report

This is a monthly summary of EMSnet performance testing -- comparing the performance against the requirements.

All results are reported on the web site:
http://corn.eos.nasa.gov/performance/Net_Health/EMSnet_list.html.
It shows MRTG-like graphs of the performance to various test sites, including thruput, RTT, packet loss, and hops, with 1 week, 2 month and 6 month graphs.

Highlights:

- Incorporated updated BAH requirements
  - Include missions through 2006
- Current requirements use Oct '02 levels
  - These are generally LOWER than previously used values
  - So some ratings improved as a result
- Future requirements use Dec '03 levels
- The requirements from GSFC to JPL were revised to include all flows using that circuit, including flows from LaRC, and flows to NASDA and ASF.
- The requirements from GSFC to EDC were revised to include all flows using that circuit, including flows from LaRC, and NSIDC.
- Most tests had stable results.

Ratings Changes:

Note: This month all ratings changes are due to requirements changes, not performance changes

Upgrades: ↑:

GSFC → LDAAC: Low → **Good**
GSFC → NSIDC: Low → **Good**
NASDA → GSFC: Low → **Adequate**
GSFC → EDC: Low → **Adequate**

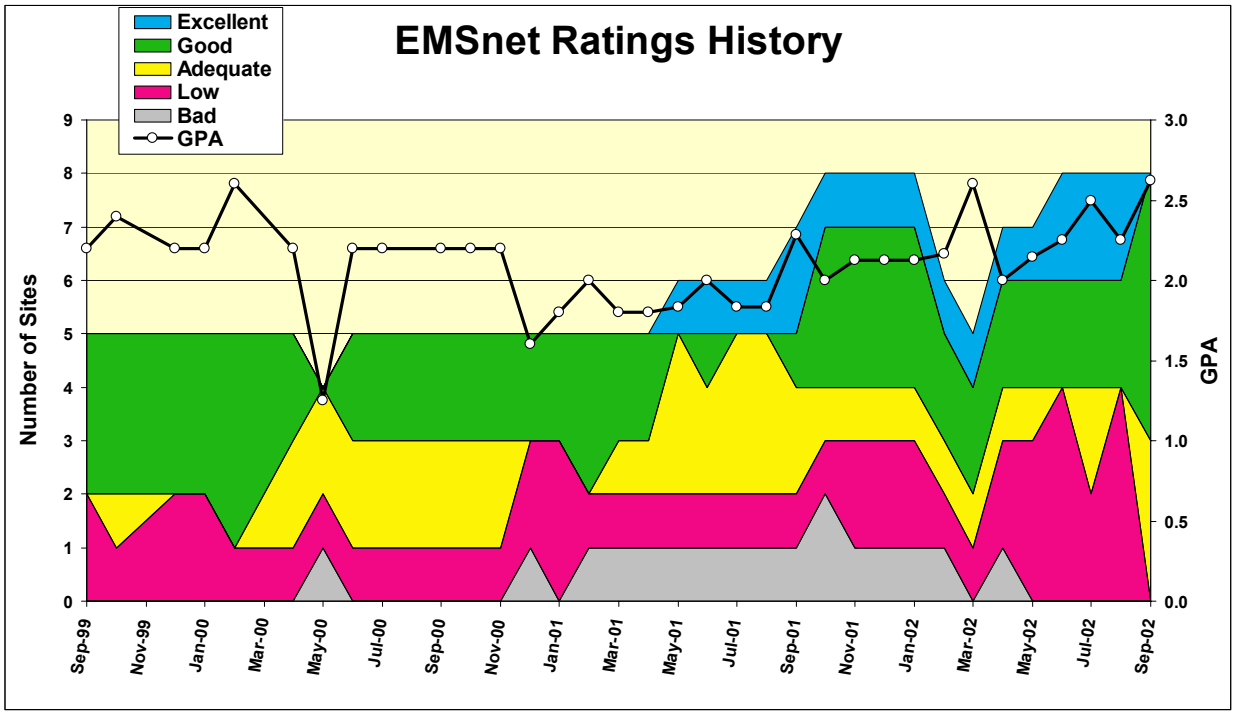
Downgrades: ↓:

GSFC → JPL: Excellent → **Good**
GSFC → ERSDAC: Excellent → **Good**

- GSFC → NASDA: Good → **Adequate**

Ratings Summary:

The chart below shows the number of sites in each classification since EMSnet testing started in September 1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



Rating Categories:

Excellent: **Total Kbps** > Requirement * 3
Good: 1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate: Requirement < **Total Kbps** < Requirement * 1.3
Low: **Total Kbps** < Requirement.
Bad: **Total Kbps** < Requirement / 3

Where Total Kbps = MRTG + iperf monthly average

EMSnet Sites:
Network Requirements vs. Measured Performance

September 2002		Requirements (kbps)		Testing						
Source -> Destination	Team (s)	Current (Oct '02)	Future (Dec '03)	Source Node : Test Period	MRTG Avg kbps	Perf Avg kbps	Total Avg kbps	Current Status re Oct '02*	Prev Stat	Current Status re Dec '03*
ASF-> NOAA	ADEOS II	1613	1613	ASF->NESDIS: 01-Apr-02 - 29-Sep-02	401	2434	2835	GOOD	G	GOOD
GSFC->EDC	MODIS, LandSat	147233	227988	DOORS-EDCTest: 19-Aug-02 - 29-Sep-02	60100	130576	190676	Adequate	L	LOW
GSFC->ERSDAC	ASTER	467	467	GDAAC: 04-Jun-02 - 29-Sep-02	67	768	835	GOOD	E	GOOD
GSFC -> JPL	QuikScat, TES, MLS, etc.	2825	6894	CSAFS: 15-Aug-02 - 26-Sep-02	609	5740	6349	GOOD	E	LOW
GSFC->LARC	CERES, MISR, MOPITT	38346	59979	GDAAC: 18-Aug-02 - 29-Sep-02	7943	69965	77908	GOOD	L	Adequate
US ->NASDA	QuikScat, TRMM, AMSR	1854	1620	CSAFS: 23-Aug-02 - 29-Sep-02	429	1792	2221	Adequate	G	GOOD
NASDA->US	AMSR	1374	1374	NASDA-EOC: 23-Aug-02 - 28-Sep-02	187	1195	1382	Adequate	L	Adequate
GSFC-> NSIDC	MODIS	29249	53111	GDAAC: 16-Aug-02 - 29-Sep-02	4902	34447	39349	GOOD	L	LOW

Notes: All flow requirements listed are the greater of inflow or outflow

Flow Requirements (from BAH) include TRMM, Terra , Aqua, QuikScat, ADEOS II

***Criteria:**

Excellent	**Total Kbps** > Requirement * 3
GOOD	1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate	Requirement < **Total Kbps** < Requirement * 1.3
LOW	**Total Kbps** < Requirement
BAD	**Total Kbps** < Requirement / 3

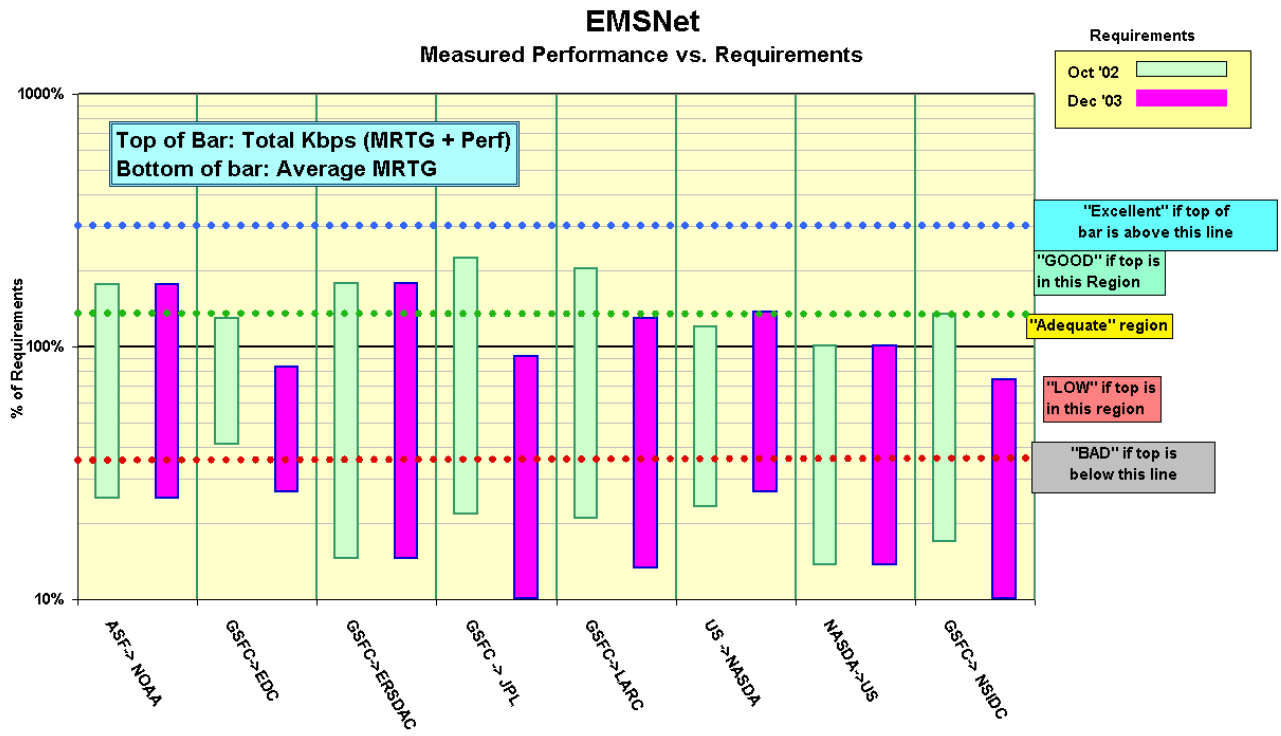
Change History:

27-Sep-99	Original - TRMM, Terra, and QuikScat
19-Jan-01	Incorporated BAH requirements including additional missions
9-Apr-01	Updated BAH requirements
4-Jun-01	Added 50% contingency to BAH requirements
16-Nov-01	Added MRTG to Iperf, updated requirements, Revised criteria
2-Oct-02	Updated to revised BAH requirements

Ratings Summary	vs Oct '02 Score	vs Oct '02 Prev	vs Dec '03 Score
Excellent	0	2	0
GOOD	5	2	3
Adequate	3	0	2
LOW	0	4	3
BAD	0	0	0
Total	8	8	8
GPA	2.63	2.25	2.00

Comparison of measured performance with Requirements:

This graph shows three bars for each destination. Each bar uses the same actual measured performance, but compares it to the requirements for two different times (Oct '02, and Dec. '03). Thus as the requirements increase, the same measured performance will be a bit lower in comparison.



Note: this chart shows that the performance to all sites is remarkably close to requirements. In the past, some sites have had performance way above the requirements, others way below. But now there are NO sites rated “Excellent”, “Low”, or “Bad” – all are either “Good” or “Adequate”!

Also note that the interpretation of these bars has changed from Sept '01. The bottom of each bar is the average measured MRTG flow to that site (previously daily minimum). Thus the bottom of each bar can be used to assess the relationship between the requirements and actual flows. Note that the requirements include a 50% contingency factor above what was specified by the projects, so a value of 66% would indicate that the project is flowing as much data as requested.

Details on individual sites:

1) ASF → CONUS: Rating: Continued Good

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
ASF → NESDIS	2679	2434	751	401	2835
ASF → GSFC-CSAFS	2608	2223	730		

Requirements:

Source → Dest	FY	mbps	Rating
ASF → NESDIS	'02, '03	1.61	Good

Comments: The 2.8 mbps total is about as expected for a 2 * T1 (3.1 mbps) circuit with competing flows. Since this is more than 30% over the Oct '02 requirement, the rating is "Good". Note: the old requirement was 1.86 mbps.

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2) GSFC → EDC: Rating: ↑ Low → Adequate

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
DOORS → EDC Test	218.3	130.6	68.9	60.1	190.7
DOORS → EDC DAAC	199.6	136.7	64.5		
G-DAAC→ EDC DAAC	157.4	85.9	38.3		

Requirements:

Date	mbps	Rating
Oct '02	147.2	Adequate
Dec '03	228.0	Low

The three test cases above show the effects of the DAAC firewalls: the top test has no firewalls in the path, just vBNS+. The next test goes through the EDC firewall, and the last test goes through both the GSFC and EDC firewalls. The firewalls thus do appear to have a significant impact on performance – at least at these high rates.

The combined MRTG + thruput now solidly above the reduced Oct '02 requirement (was 250 mbps last month), increasing the rating to “Adequate”. But performance is still below the Dec '03 requirement.

3) GSFC → ERSDAC:

Rating: ↓ Excellent → **Good**

GSFC → ERSDAC Test Results:

Test Period	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
4-Jun-02 – 31-Aug-02	795	768	460	67	835

Performance using the 1 mbps ATM connection (since June '02) is very stable. However, the requirement was raised from 275 kbps to 467 kbps (1 IST @ 311 kbps * 1.5 Contingency), so the rating drops to "Good"

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → ERSDAC	'02, '03	467	Good

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4) JPL:

Rating: ↓ Excellent → **Good**

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-CSAFS → JPL-SEAPAC	6.1	5.7	3.7	0.6	6.3
LaRC DAAC → JPL-TES	6.0	5.9	4.6		
GSFC DAAC → JPL-TES	20.9	11.1	3.6		
GSFC-MTVS1 → JPL-PODAAC	5.9	5.7	4.7		
NASDA-EOC→ JPL-SEAPAC	N/A	N/A	N/A		
ASF→ JPL-SEAPAC	2.8	2.7	1.3		

Requirements:

Source → Dest	Date	mbps	Rating
GSFC → JPL combined	Oct '02	2.82	Good
GSFC → JPL combined	July '03	7.40	Low
LaRC DAAC → JPL-TES	July '03	4.58	Good

The GSFC-JPL requirement above revised to includes all flows on the GSFC-JPL circuit, including flows from LaRC and flows to NASDA and ASF. The rating is based on testing from CSAFS at GSFC to SEAPAC at JPL. Also note that the MRTG value above also includes these flows.

Performance on this circuit improved on 15 August (was typ. 3.9 mbps), due to BOP switchover. However, with the increased combined requirement of 2.8 mbps (prev 0.9 mbps), the performance rates only as "Good". Adding in the 4.6 mbps of Aura requirements from LaRC, the performance is below the combined 7.4 mbps requirement next July.

Performance from LDAAC to JPL-TES also improved from 2.9 to 6.0 mbps on Aug 15 due to BOP.

The route from GDAAC to JPL-TES is still NISN SIP (since May 8). Performance improved substantially as a result. However, this is only a temporary route for this flow -- the intended route is via EMSnet, which should be installed after the GSFC LAN upgrade is complete.

Testing from GSFC-DAAC to JPL-PODAAC is also currently routed via NISN SIP, so EMSnet testing is performed from MTVS1. On 15 August, Performance improved due to BOP, from 3.3 mbps median (somewhat noisy) to 5.7 mbps steady.

NASDA → JPL-SEAPAC testing was not restored until October, so no measurements this month. Thruput had been stable at 2.1 mbps typical.

ASF → JPL-SEAPAC thruput was steady at about 2.6 mbps, using the 2 T1s.

5) GSFC → LaRC:

Rating: ↑ Low → **Good**

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
GDAAC → LDAAC	88.5	70.0	42.1	7.9	77.9

Requirements:

Date	mbps	Rating
Oct '02	38.3	Good
Dec '03	60.0	Adequate

Testing to LaRC resumed on 3 July, when the LaRC ECS firewall was configured to allow testing. It had been stopped June 13, for installation of the firewall, during which time the NISN circuit had been upgraded. In August the circuit was switched to BOP.

Performance in this configuration is much improved from the old one, which had a median of only about 50 mbps. The requirements were revised this month (was 113 mbps last month), so the rating improves to "Good" from "Low".

6A) US (GSFC) → NASDA:

Rating: ↓ Good → **Adequate**

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-CSAFS → NASDA-EOC	2139	1792	613	429	2221

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → NASDA	Oct '02	1854	Adequate
GSFC → NASDA	Dec '03	1620	Good

Testing was down most of August for switchover to new circuit; resumed 23 August. Performance about the same as the old circuit (perhaps a bit lower), about as expected for a 3 mbps ATM PVC (using multiple TCP streams to mitigate TCP window size limitation at NASDA). The requirement was revised from 863 kbps last month, dropping the rating to "Adequate".

6B) NASDA → US (GSFC): Rating: ↑ Low → Adequate

Test Results:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	MRTG	TOTAL
NASDA-EOC → GSFC-CSAFS	1372	1195	487	187	1382

Requirements:

Source → Dest	FY	kbps	Rating
NASDA → GSFC	'02, '03	1374	Adequate

Performance dropped a bit with the switchover to the new circuit – median had been 1.5 mbps previously. Performance is still limited by the NASDA machine window size. NASDA has installed updated scripts, and should be able to use multiple TCP streams soon. Requirement revised from 1574 kbps last month, so rating improves to "Adequate"

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7) NSIDC: Rating: ↑ Low → Good

GSFC → NSIDC Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	MRTG	TOTAL
GSFC-DAAC → NSIDC	43.2	34.4	26.4	4.9	39.3

Requirements:

Date	mbps	Rating
Oct '02	29.2	Good
Dec '03	53.1	Low

Testing to NSIDC from GDAAC via EMSnet is stable after the switch to BOP. The Oct '02 requirement dropped (was 108 mbps previously), so the rating improved. The future requirement is higher, and the performance is below it, so that rating remains "Low".

Other Testing:

Source → Dest	Medians of daily tests (kbps)				
	Best	Median	Worst	Requirement	Rating
JPL → NSIDC-SIDADS	5607	3988	2939	260	Excellent
LDAAC - NSIDC	4636	4476	4083		

Performance is very steady from both sources, and higher than before the BOP.